

Supplementary Materials

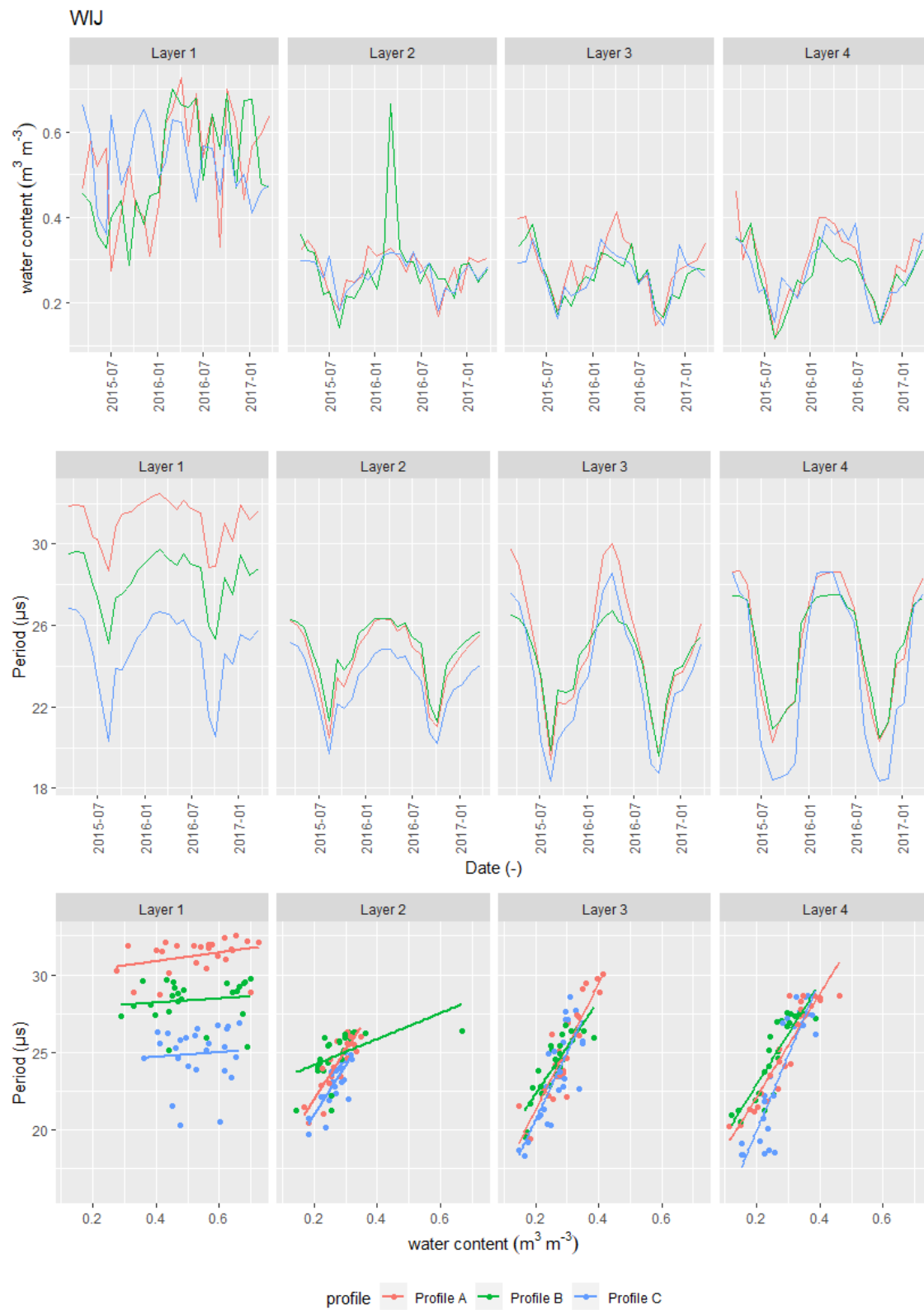


Figure S1. Layer specific relationships between reference gravimetric water content and FDR response (Period) for the WIJ site.



Figure S2. Layer specific relationships between reference gravimetric water content and FDR response (Period) for the RAV site.

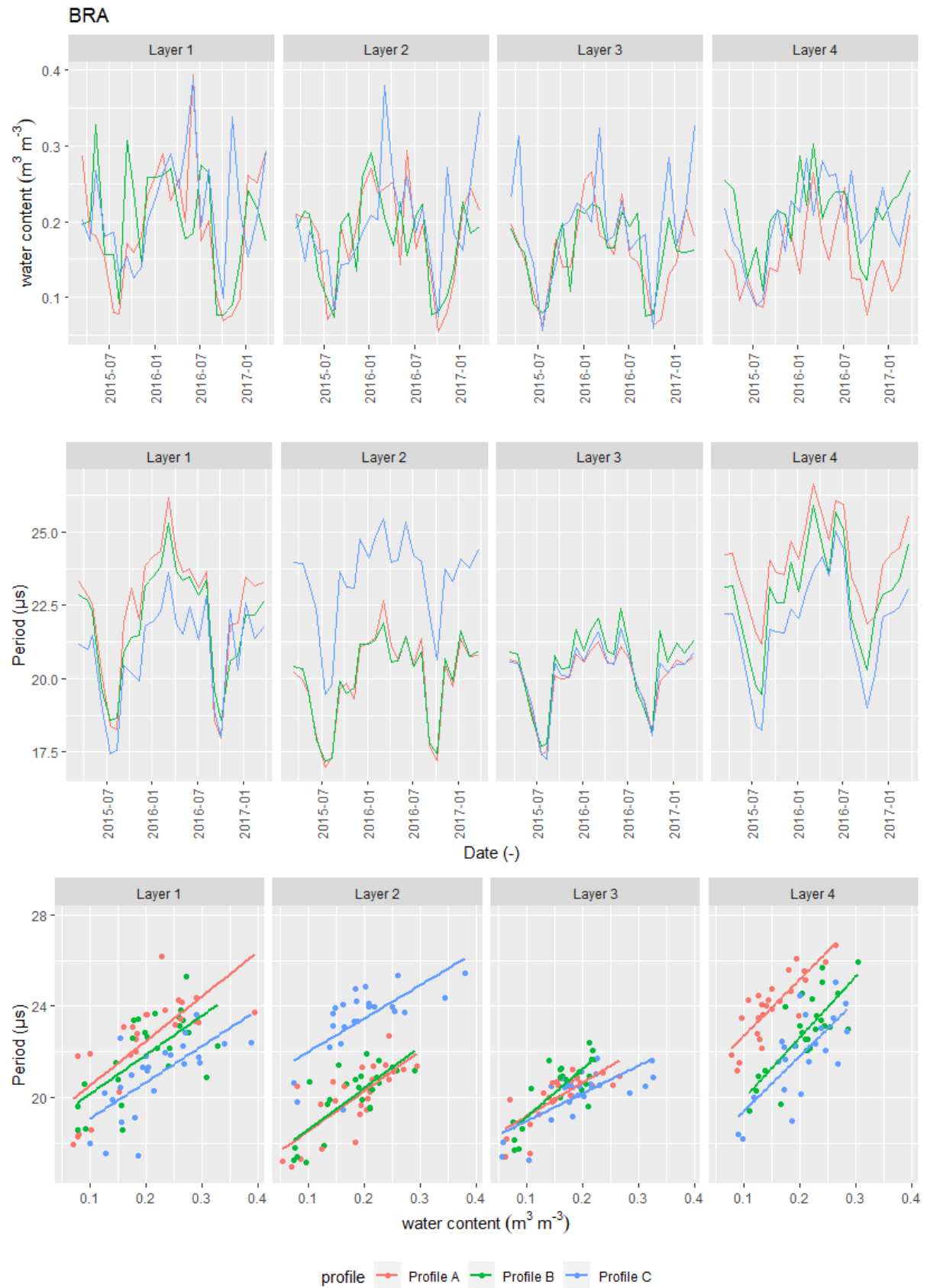


Figure S3. Layer specific relationships between reference gravimetric water content and FDR response (Period) for the BRA site.



Figure S4. Layer specific relationships between reference gravimetric water content and FDR response (Period) for the GON site.

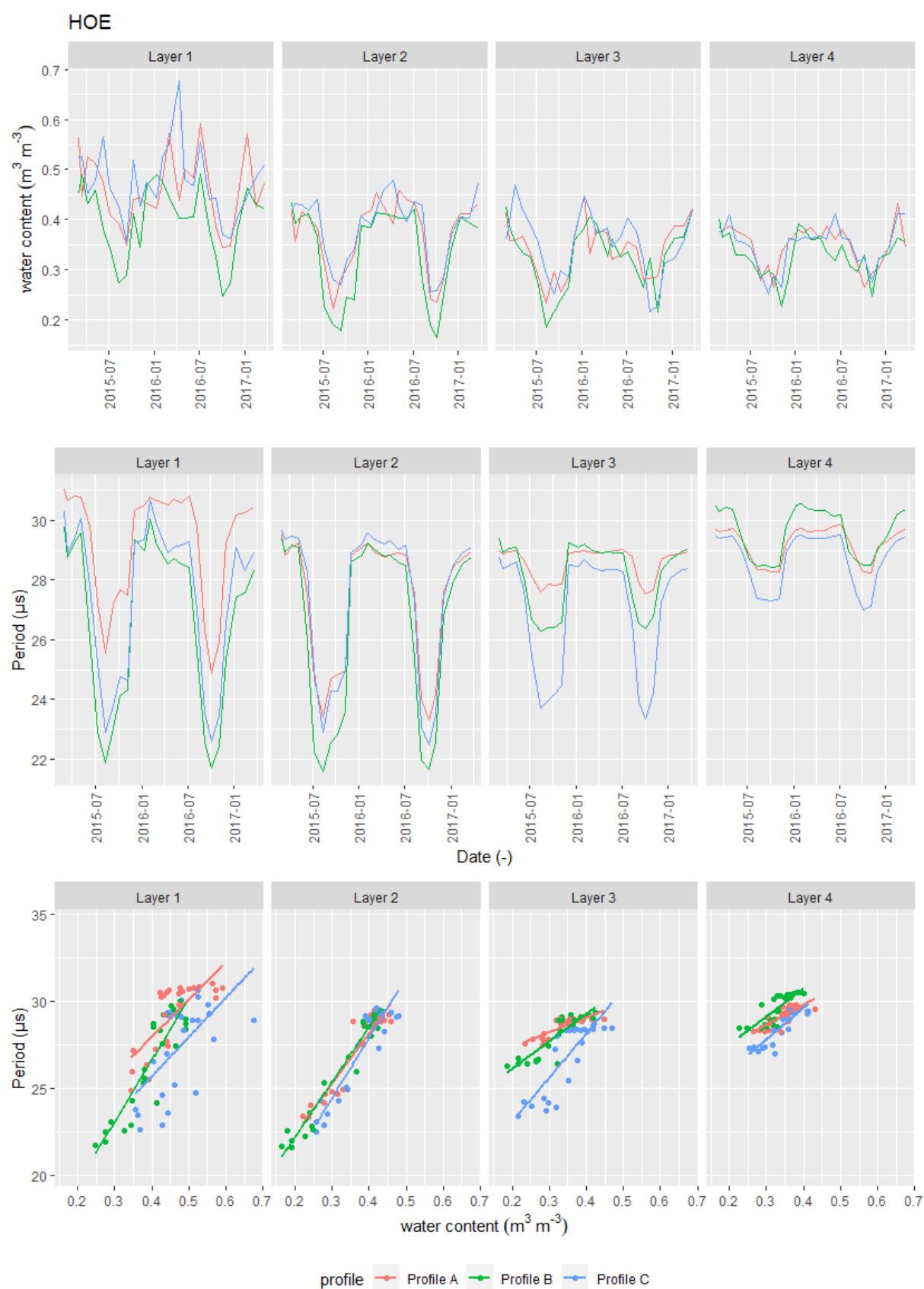


Figure S5. Layer specific relationships between reference gravimetric water content and FDR response (Period) for the HOE site.

Table S1. Coefficients and predictive quality of standard calibration functions for all profiles and depths of the WIJ site

Profile	Layer	Model	Coefficients			Without temp correction					With temp correction				
			C0	C1	C2	R ² _{adj}	MPE	SDPE	RMSPE	d _r	R ² _{adj}	MPE	SDPE	RMSPE	d _r
A	M01	LM	-0.4677	0.0283	-	0.102	-0.1132	0.1192	0.163	0.337	0.049	-0.0589	0.1259	0.1367	0.469
		QM	-0.0663	-0.0063	0.0007	0.104	-0.1088	0.1187	0.1593	0.351	0.048	-0.0325	0.1332	0.1345	0.502
	M12	LM	-0.4677	0.0283	-	0.778	-0.0542	0.023	0.0587	0.302	0.787	-0.0339	0.0267	0.0428	0.536
		QM	-0.0663	-0.0063	0.0007	0.779	-0.0783	0.0225	0.0814	-0.009	0.783	-0.0571	0.0264	0.0627	0.264
	M24	LM	-0.4677	0.0283	-	0.812	-0.0514	0.0393	0.0642	0.472	0.822	-0.0256	0.0529	0.0578	0.529
		QM	-0.0663	-0.0063	0.0007	0.807	-0.0712	0.0409	0.0817	0.309	0.809	-0.0414	0.0613	0.073	0.385
	M48	LM	-0.4677	0.0283	-	0.859	-0.0461	0.0332	0.0564	0.648	0.856	-0.0186	0.0414	0.0447	0.748
		QM	-0.0663	-0.0063	0.0007	0.848	-0.0657	0.0347	0.074	0.516	0.841	-0.034	0.0471	0.0574	0.658
B	OFH	LM	-0.4677	0.0283	-	0.017	-0.1816	0.1285	0.221	0.182	0.008	-0.1463	0.1346	0.197	0.303
		QM	-0.0663	-0.0063	0.0007	0.02	-0.1973	0.129	0.2343	0.122	0.01	-0.1532	0.1382	0.2044	0.278
	M12	LM	-0.4677	0.0283	-	0.27	-0.0453	0.0799	0.0905	0.535	0.304	-0.0236	0.0778	0.0798	0.631
		QM	-0.0663	-0.0063	0.0007	0.284	-0.0699	0.0794	0.1046	0.343	0.321	-0.0469	0.0768	0.0887	0.524
	M24	LM	-0.4677	0.0283	-	0.753	-0.0458	0.0291	0.054	0.483	0.755	-0.0256	0.0326	0.041	0.621
		QM	-0.0663	-0.0063	0.0007	0.761	-0.0692	0.028	0.0744	0.222	0.759	-0.0481	0.0316	0.0572	0.452
	M48	LM	-0.4677	0.0283	-	0.789	-0.0232	0.0332	0.04	0.707	0.792	0.0018	0.0396	0.0389	0.711
		QM	-0.0663	-0.0063	0.0007	0.79	-0.045	0.0328	0.0553	0.575	0.79	-0.0171	0.0412	0.0439	0.681
C	OFH	LM	-0.4677	0.0283	-	0.005	-0.2951	0.0979	0.3103	-0.502	0.001	-0.2758	0.1044	0.2942	-0.467
		QM	-0.0663	-0.0063	0.0007	0.006	-0.3189	0.0965	0.3326	-0.539	0.002	-0.2982	0.1038	0.3151	-0.507
	M12	LM	-0.4677	0.0283	-	0.674	-0.0811	0.0247	0.0847	-0.25	0.658	-0.0657	0.029	0.0716	-0.075
		QM	-0.0663	-0.0063	0.0007	0.67	-0.1042	0.0232	0.1066	-0.417	0.65	-0.0891	0.0272	0.0931	-0.318
	M24	LM	-0.4677	0.0283	-	0.633	-0.0689	0.0525	0.086	0.172	0.616	-0.0494	0.0646	0.0803	0.19
		QM	-0.0663	-0.0063	0.0007	0.593	-0.088	0.0509	0.1012	-0.009	0.569	-0.0673	0.0659	0.0932	0.059
	M48	LM	-0.4677	0.0283	-	0.793	-0.0741	0.059	0.094	0.401	0.79	-0.0503	0.0744	0.0885	0.437
		QM	-0.0663	-0.0063	0.0007	0.798	-0.0886	0.0531	0.1028	0.308	0.788	-0.0618	0.0731	0.0946	0.384

Table S2. Coefficients and predictive quality of standard calibration functions for all profiles and depths of the RAV site

Profile	Layer	Model	Coefficients			Without temp correction					With temp correction				
			C0	C1	C2	R ² _{adj}	MPE	SDPE	RMSPE	d _r	R ² _{adj}	MPE	SDPE	RMSPE	d _r
A	M01	LM	-0.4677	0.0283	-	0.012	-0.0912	0.0712	0.1148	-0.025	0.009	-0.0799	0.074	0.1079	0.058
		QM	-0.0663	-0.0063	0.0007	0.011	-0.1093	0.0686	0.1283	-0.162	0.008	-0.0993	0.0711	0.1214	-0.105
	M12	LM	-0.4677	0.0283	-	0.441	0.0031	0.0451	0.0443	0.633	0.47	0.0177	0.0451	0.0476	0.585
		QM	-0.0663	-0.0063	0.0007	0.43	-0.0187	0.0445	0.0475	0.614	0.463	-0.0047	0.0439	0.0433	0.651
	M24	LM	-0.4677	0.0283	-	0.527	-0.0623	0.0352	0.0712	0.139	0.527	-0.0529	0.0359	0.0635	0.253
		QM	-0.0663	-0.0063	0.0007	0.528	-0.0739	0.0346	0.0813	-0.015	0.525	-0.0662	0.0345	0.0744	0.091
	M48	LM	-0.4677	0.0283	-	0.713	-0.0129	0.0119	0.0174	0.598	0.718	-0.0048	0.0119	0.0126	0.720
		QM	-0.0663	-0.0063	0.0007	0.707	-0.0183	0.0128	0.0222	0.454	0.712	-0.0123	0.0123	0.0172	0.598
B	M01	LM	-0.4677	0.0283	-	0.418	-0.1484	0.0615	0.1601	-0.146	0.4	-0.1372	0.0638	0.1507	-0.076
		QM	-0.0663	-0.0063	0.0007	0.412	-0.1615	0.0612	0.1722	-0.215	0.391	-0.1517	0.0625	0.1636	-0.164
	M12	LM	-0.4677	0.0283	-	0.126	-0.0123	0.0739	0.0734	0.474	0.125	0.0051	0.0787	0.0772	0.422
		QM	-0.0663	-0.0063	0.0007	0.138	-0.0337	0.069	0.0755	0.478	0.137	-0.0164	0.0738	0.0741	0.470
	M24	LM	-0.4677	0.0283	-	0.18	-0.0759	0.0576	0.0946	0.197	0.16	-0.0645	0.0603	0.0875	0.273
		QM	-0.0663	-0.0063	0.0007	0.184	-0.094	0.0553	0.1085	0.049	0.162	-0.0838	0.0575	0.101	0.137
	M48	LM	-0.4677	0.0283	-	0.693	-0.0207	0.0153	0.0256	0.504	0.667	-0.0126	0.016	0.0201	0.630
		QM	-0.0663	-0.0063	0.0007	0.697	-0.0259	0.0168	0.0306	0.419	0.67	-0.0198	0.0167	0.0257	0.538
C	M01	LM	-0.4677	0.0283	-	0.256	0.0054	0.0791	0.0777	0.491	0.271	0.0319	0.0861	0.0902	0.419
		QM	-0.0663	-0.0063	0.0007	0.262	-0.0152	0.0792	0.0791	0.476	0.276	0.015	0.0898	0.0893	0.419
	M12	LM	-0.4677	0.0283	-	0.606	0.0131	0.0474	0.0483	0.675	0.601	0.0334	0.0477	0.0574	0.633
		QM	-0.0663	-0.0063	0.0007	0.629	-0.0106	0.0467	0.047	0.681	0.623	0.0107	0.0462	0.0465	0.677
	M24	LM	-0.4677	0.0283	-	0.613	-0.0147	0.0387	0.0407	0.691	0.591	5.00E-04	0.0403	0.0395	0.701
		QM	-0.0663	-0.0063	0.0007	0.605	-0.0371	0.0397	0.0537	0.552	0.58	-0.0224	0.0404	0.0454	0.647
	M48	LM	-0.4677	0.0283	-	0.742	-0.0523	0.0244	0.0576	0.245	0.746	-0.0428	0.0254	0.0495	0.357
		QM	-0.0663	-0.0063	0.0007	0.701	-0.0643	0.0254	0.069	0.099	0.706	-0.0564	0.0258	0.0618	0.190

Table S3. Coefficients and predictive quality of standard calibration functions for all profiles and depths of the BRA site

Profile	Layer	Model	Coefficients			Without temp correction					With temp correction				
			C0	C1	C2	R ² _{adj}	MPE	SDPE	RMSPE	d _r	R ² _{adj}	MPE	SDPE	RMSPE	d _r
A	M01	LM	-0.4677	0.0283	-	0.572	-0.0288	0.0542	0.0604	0.652	0.56	-0.0149	0.0552	0.0561	0.686
		QM	-0.0663	-0.0063	0.0007	0.568	-0.0481	0.0556	0.0727	0.568	0.546	-0.0348	0.0558	0.0648	0.620
	M12	LM	-0.4677	0.0283	-	0.569	-0.0854	0.0432	0.0953	0.166	0.564	-0.0766	0.0431	0.0875	0.242
		QM	-0.0663	-0.0063	0.0007	0.563	-0.0945	0.0463	0.1049	0.090	0.556	-0.0875	0.0456	0.0983	0.151
	M24	LM	-0.4677	0.0283	-	0.578	-0.0588	0.0367	0.0689	0.258	0.578	-0.0506	0.0361	0.0617	0.350
		QM	-0.0663	-0.0063	0.0007	0.589	-0.0688	0.0396	0.079	0.144	0.589	-0.0623	0.0387	0.073	0.218
	M48	LM	-0.4677	0.0283	-	0.694	0.0600	0.0267	0.0655	0.219	0.676	0.0775	0.0287	0.0824	-0.009
		QM	-0.0663	-0.0063	0.0007	0.708	0.0356	0.0261	0.0438	0.508	0.69	0.0533	0.0279	0.0598	0.296
B	M01	LM	-0.4677	0.0283	-	0.45	-0.0487	0.0531	0.0713	0.542	0.425	-0.0366	0.0552	0.0653	0.595
		QM	-0.0663	-0.0063	0.0007	0.437	-0.0671	0.0537	0.0853	0.418	0.409	-0.056	0.055	0.0777	0.501
	M12	LM	-0.4677	0.0283	-	0.577	-0.079	0.0393	0.0879	0.193	0.568	-0.0703	0.0395	0.0802	0.272
		QM	-0.0663	-0.0063	0.0007	0.569	-0.0884	0.0423	0.0976	0.111	0.558	-0.0814	0.0417	0.0911	0.173
	M24	LM	-0.4677	0.0283	-	0.634	-0.0511	0.0298	0.0589	0.329	0.626	-0.0424	0.03	0.0515	0.426
		QM	-0.0663	-0.0063	0.0007	0.627	-0.0634	0.0319	0.0707	0.174	0.619	-0.0563	0.0314	0.0641	0.267
	M48	LM	-0.4677	0.0283	-	0.605	-0.029	0.0324	0.043	0.519	0.621	-0.0148	0.0339	0.0364	0.604
		QM	-0.0663	-0.0063	0.0007	0.589	-0.051	0.032	0.0598	0.297	0.604	-0.0373	0.0332	0.0495	0.428
C	M01	LM	-0.4677	0.0283	-	0.468	-0.0911	0.0522	0.1044	0.204	0.454	-0.0811	0.0529	0.0962	0.277
		QM	-0.0663	-0.0063	0.0007	0.479	-0.1054	0.0531	0.1175	0.093	0.461	-0.0968	0.053	0.1099	0.159
	M12	LM	-0.4677	0.0283	-	0.448	-0.0019	0.052	0.051	0.627	0.49	0.0139	0.0499	0.0508	0.582
		QM	-0.0663	-0.0063	0.0007	0.467	-0.0254	0.0518	0.0568	0.614	0.514	-0.0099	0.0489	0.0489	0.656
	M24	LM	-0.4677	0.0283	-	0.536	-0.0937	0.0504	0.1059	0.044	0.564	-0.0854	0.0488	0.0978	0.129
		QM	-0.0663	-0.0063	0.0007	0.535	-0.1042	0.054	0.1169	-0.06	0.565	-0.0976	0.0524	0.1103	0.004
	M48	LM	-0.4677	0.0283	-	0.528	-0.0497	0.0381	0.0622	0.380	0.523	-0.0381	0.0398	0.0546	0.476
		QM	-0.0663	-0.0063	0.0007	0.514	-0.0681	0.0372	0.0772	0.183	0.51	-0.0576	0.0382	0.0687	0.300

Table S4. Coefficients and predictive quality of standard calibration functions for all profiles and depths of the GON site

Profile	Layer	Model	Coefficients			Without temp correction					With temp correction				
			C0	C1	C2	R ² _{adj}	MPE	SDPE	RMSPE	d _r	R ² _{adj}	MPE	SDPE	RMSPE	d _r
A	M01	LM	-0.4677	0.0283	-	0.516	-0.1633	0.0733	0.1784	-0.077	0.408	-0.1271	0.0765	0.1475	0.157
		QM	-0.0663	-0.0063	0.0007	0.514	-0.1825	0.0721	0.1957	-0.174	0.394	-0.1389	0.0778	0.1584	0.079
	M12	LM	-0.4677	0.0283	-	0.658	-0.0867	0.0509	0.1	0.336	0.656	-0.0569	0.0504	0.0753	0.548
		QM	-0.0663	-0.0063	0.0007	0.667	-0.1085	0.05	0.1191	0.169	0.663	-0.0742	0.0507	0.0893	0.426
	M24	LM	-0.4677	0.0283	-	0.8	-0.0746	0.0423	0.0853	0.528	0.803	-0.0495	0.0459	0.0669	0.656
		QM	-0.0663	-0.0063	0.0007	0.801	-0.0943	0.0419	0.1028	0.403	0.805	-0.0663	0.0455	0.0799	0.565
	M48	LM	-0.4677	0.0283	-	0.196	0.1545	0.0916	0.1787	-0.119	0.239	0.2842	0.1298	0.3114	-0.514
		QM	-0.0663	-0.0063	0.0007	0.196	0.2263	0.1211	0.2555	-0.394	0.244	0.4565	0.2285	0.5085	-0.698
B	OFH	LM	-0.4677	0.0283	-	0.585	-0.1928	0.0588	0.2012	-0.29	0.524	-0.1169	0.0623	0.1319	0.129
		QM	-0.0663	-0.0063	0.0007	0.587	-0.177	0.0563	0.1854	-0.227	0.514	-0.0647	0.0801	0.1017	0.382
	M12	LM	-0.4677	0.0283	-	0.468	-0.124	0.0631	0.1385	0.049	0.509	-0.0817	0.0603	0.1008	0.353
		QM	-0.0663	-0.0063	0.0007	0.457	-0.1391	0.0631	0.1522	-0.063	0.491	-0.0861	0.0647	0.1069	0.312
	M24	LM	-0.4677	0.0283	-	0.436	0.0812	0.0636	0.1024	0.3	0.456	0.1941	0.062	0.2033	-0.359
		QM	-0.0663	-0.0063	0.0007	0.44	0.1394	0.061	0.1517	-0.125	0.456	0.3272	0.0879	0.3383	-0.62
	M48	LM	-0.4677	0.0283	-	0.057	0.1575	0.0723	0.1726	-0.338	0.055	0.3460	0.1132	0.3632	-0.695
		QM	-0.0663	-0.0063	0.0007	0.054	0.3054	0.0957	0.3193	-0.654	0.053	0.6787	0.2164	0.7109	-0.844
C	OFH	LM	-0.4677	0.0283	-	0.092	-0.1137	0.0851	0.141	0.099	0.019	-0.051	0.1074	0.1169	0.212
		QM	-0.0663	-0.0063	0.0007	0.094	-0.1117	0.0903	0.1425	0.074	0.017	-0.0238	0.1301	0.1297	0.128
	M12	LM	-0.4677	0.0283	-	0.124	-0.0482	0.0766	0.0892	0.431	0.05	0.0028	0.0848	0.0831	0.464
		QM	-0.0663	-0.0063	0.0007	0.121	-0.0565	0.0771	0.0944	0.395	0.045	0.0104	0.0915	0.0902	0.417
	M24	LM	-0.4677	0.0283	-	0.266	0.0848	0.0479	0.097	-0.061	0.098	0.1666	0.0614	0.1771	-0.522
		QM	-0.0663	-0.0063	0.0007	0.269	0.107	0.048	0.1169	-0.256	0.095	0.2295	0.0771	0.2416	-0.653
	M48	LM	-0.4677	0.0283	-	0.003	0.2503	0.1056	0.2708	-0.294	0.002	0.4260	0.14	0.4474	-0.585
		QM	-0.0663	-0.0063	0.0007	0.002	0.3816	0.1139	0.3975	-0.537	0.003	0.7202	0.2147	0.7502	-0.755

Table S5. Coefficients and predictive quality of standard calibration functions for all profiles and depths of the HOE site

Profile	Layer	Model	Coefficients			Without temp correction					With temp correction				
			C0	C1	C2	R ² _{adj}	MPE	SDPE	RMSPE	d _r	R ² _{adj}	MPE	SDPE	RMSPE	d _r
A	M01	LM	-0.4677	0.0283	-	0.576	-0.0989	0.0452	0.1084	0.099	0.544	-0.0453	0.0548	0.0703	0.455
		QM	-0.0663	-0.0063	0.0007	0.58	-0.1082	0.0466	0.1174	0.015	0.543	-0.0373	0.0685	0.0768	0.418
	M12	LM	-0.4677	0.0283	-	0.903	-0.0646	0.0227	0.0683	0.454	0.868	-0.0243	0.0303	0.0384	0.732
		QM	-0.0663	-0.0063	0.0007	0.897	-0.0827	0.0227	0.0856	0.302	0.854	-0.0333	0.0399	0.0514	0.644
	M24	LM	-0.4677	0.0283	-	0.687	0.0006	0.0411	0.0403	0.621	0.73	0.0451	0.0315	0.0547	0.428
		QM	-0.0663	-0.0063	0.0007	0.687	-0.015	0.0392	0.0413	0.628	0.729	0.0403	0.0286	0.0491	0.486
	M48	LM	-0.4677	0.0283	-	0.703	0.0101	0.0302	0.0313	0.665	0.705	0.061	0.0235	0.0652	0.108
		QM	-0.0663	-0.0063	0.0007	0.703	-0.0017	0.0281	0.0276	0.675	0.703	0.0635	0.0238	0.0676	0.072
B	M01	LM	-0.4677	0.0283	-	0.814	-0.1136	0.0347	0.1186	0.024	0.797	-0.0763	0.05	0.0907	0.345
		QM	-0.0663	-0.0063	0.0007	0.801	-0.1318	0.0383	0.137	-0.117	0.778	-0.0864	0.0617	0.1055	0.247
	M12	LM	-0.4677	0.0283	-	0.955	-0.0534	0.0201	0.0569	0.673	0.942	-0.0159	0.0282	0.0319	0.853
		QM	-0.0663	-0.0063	0.0007	0.951	-0.0713	0.0204	0.0741	0.564	0.931	-0.0256	0.0381	0.0453	0.78
	M24	LM	-0.4677	0.0283	-	0.771	0.0022	0.0395	0.0388	0.698	0.797	0.0451	0.0303	0.054	0.531
		QM	-0.0663	-0.0063	0.0007	0.772	-0.0149	0.0366	0.0389	0.699	0.8	0.038	0.0294	0.0477	0.585
	M48	LM	-0.4677	0.0283	-	0.66	0.0404	0.0271	0.0483	0.382	0.65	0.0952	0.0267	0.0987	-0.307
		QM	-0.0663	-0.0063	0.0007	0.661	0.0313	0.0254	0.04	0.508	0.654	0.1031	0.0339	0.1083	-0.36
C	M01	LM	-0.4677	0.0283	-	0.374	-0.1674	0.0637	0.1787	-0.372	0.351	-0.1256	0.0792	0.1477	-0.162
		QM	-0.0663	-0.0063	0.0007	0.368	-0.1839	0.0677	0.1955	-0.428	0.341	-0.1317	0.0918	0.1595	-0.201
	M12	LM	-0.4677	0.0283	-	0.865	-0.0773	0.0264	0.0815	0.316	0.835	-0.0358	0.042	0.0546	0.621
		QM	-0.0663	-0.0063	0.0007	0.858	-0.0942	0.0295	0.0985	0.166	0.821	-0.0428	0.0543	0.0683	0.525
	M24	LM	-0.4677	0.0283	-	0.67	-0.0574	0.037	0.0679	0.425	0.63	-0.0206	0.0455	0.0491	0.593
		QM	-0.0663	-0.0063	0.0007	0.668	-0.0774	0.0378	0.0858	0.228	0.624	-0.0333	0.0517	0.0606	0.498
	M48	LM	-0.4677	0.0283	-	0.749	-0.0035	0.0253	0.025	0.733	0.703	0.0439	0.0248	0.0502	0.361
		QM	-0.0663	-0.0063	0.0007	0.749	-0.0181	0.0234	0.0292	0.676	0.702	0.0415	0.0296	0.0506	0.361